

CHANGE

NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 1 April 2001

**UNIT
MAINTENANCE MANUAL**

VOLUME 5 OF 5

**BRIDGE LAUNCHING CARRIER:
M104 WOLVERINE
(5420-01-430-5403)**

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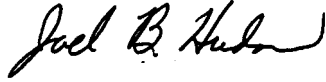
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JOEL B. HUDSON
Administrative Assistant to the
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0103006

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ALTERNATOR REPLACEMENT (Sheet 1 of 1)

TOOLS: General mechanic's tool kit: automotive (SC 5180-90-N26)

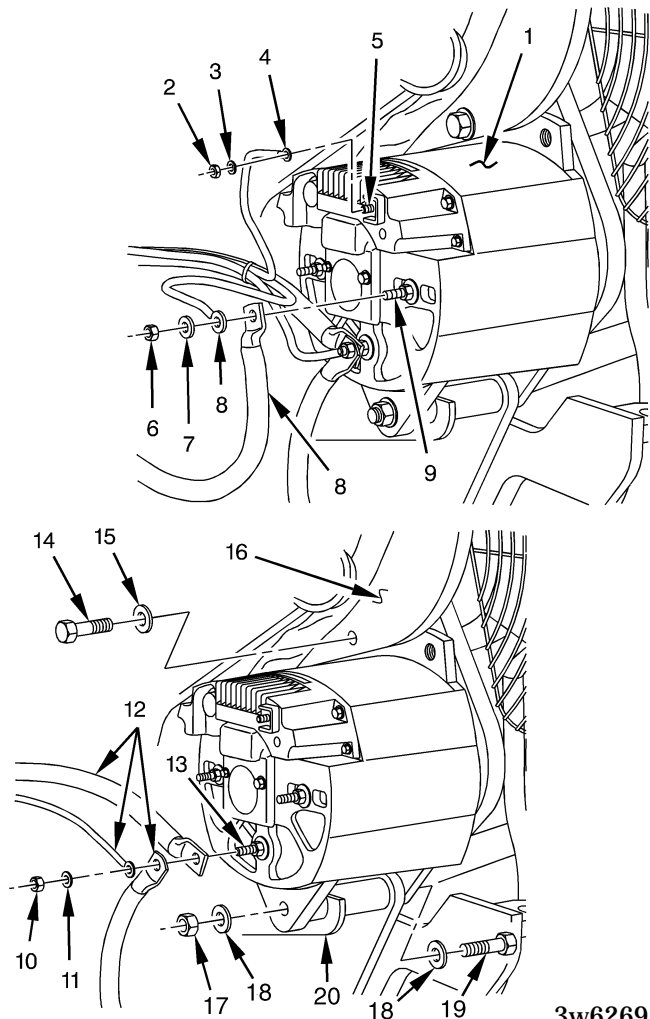
SUPPLIES: Self-locking nut (Item 503, Appendix G)

EQUIPMENT CONDITION: Launcher power unit removed (page 25-38)
Serpentine belt removed (page 25-9)

REMOVAL:**WARNING**

Hot exhaust pipe can cause severe burns.

1. REMOVE ALTERNATOR (1).
 - a. Remove nut (2), washer (3), and terminal lug (4) from terminal (5) on alternator (1).
 - b. Remove nut (6), washer (7), and two terminal lugs (8) from negative terminal (9) on alternator (1).
 - c. Remove nut (10), washer (11), and three terminal lugs (12) from positive terminal (13) on alternator (1).
 - d. Remove screw (14) and washer (15) from alternator (1) and upper mount (16).
 - e. Remove self-locking nut (17), two washers (18), and screw (19) from bottom mount (20). Remove alternator (1) from mount (20).
2. INSPECT PARTS FOR DAMAGE. REPLACE AS REQUIRED.



Go on to Sheet 2

3w6269

RATED SPEED SOLENOID REPLACEMENT (Sheet 1 of 1)

TOOLS: General mechanic's tool kit: automotive (SC 5180-90-N26)

SUPPLIES: Locknut (Item 105, Appendix G)
 Locknut (Item 103, Appendix G) (2 required)
 Electrical tiedown strap (Item 448, Appendix G) (2 required)

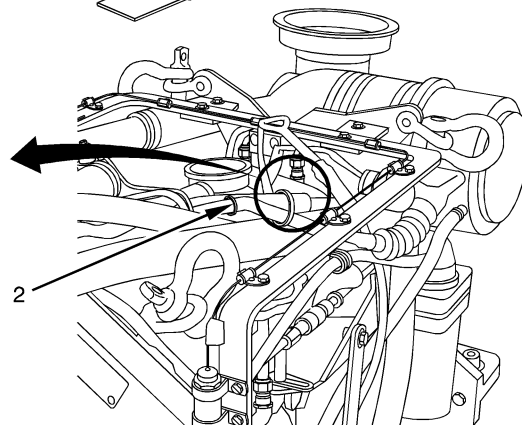
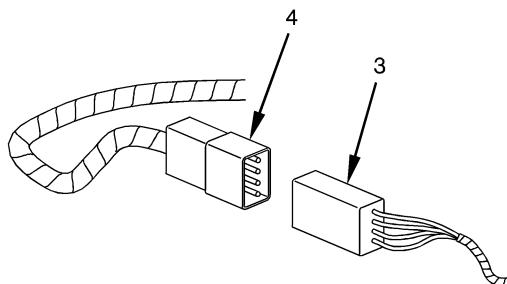
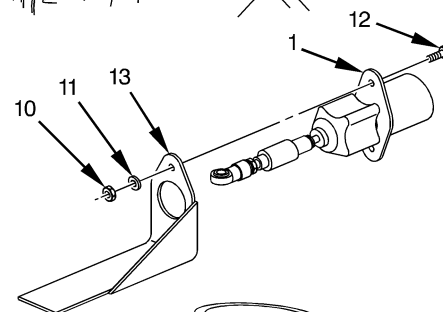
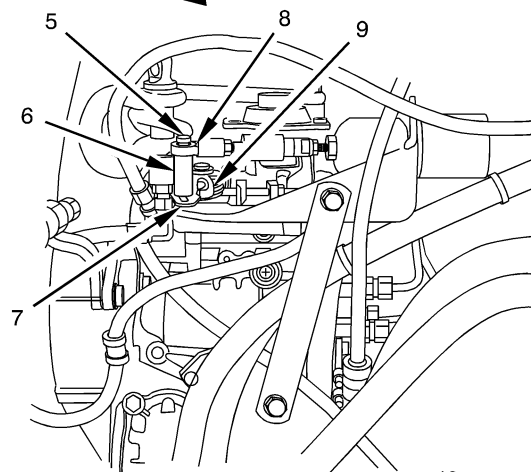
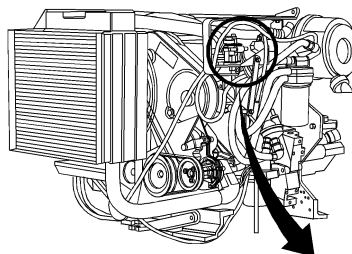
EQUIPMENT CONDITION: Outboard access door opened (TM 5-5420-232-10)
 Upper cover opened (TM 5-5420-232-10)

REMOVAL:

1. REMOVE RATED SPEED SOLENOID ASSEMBLY (1).
 - a. Remove two electrical tiedown straps (2) and disconnect solenoid connector (3) from engine control harness connector (4).
 - b. Remove screw (5), spacer (6), and locknut (7) from ball joint (8) and injector pump linkage (9).
 - c. Remove two locknuts (10), washers (11), and screws (12) from solenoid (1) and bracket (13).
 - d. Remove solenoid (1) from bracket (13).
2. INSPECT PARTS FOR DAMAGE. REPLACE AS REQUIRED.

INSTALLATION:

1. INSTALL SOLENOID (1).
 - a. Position solenoid (1) to bracket (13).
 - b. Install two new nuts (10), washers (11) and screws (12).
 - c. Install screw (5) through ball joint (8), spacer (6) and injector pump linkage (9).
 - d. Install new locknut (7) to screw (5).
 - e. Connect solenoid connector (3) to engine control harness connector (4). Install two new straps (2).
2. PERFORM LPU ENGINE RPM CHECK/ ADJUST (PAGE 25-81).
3. CLOSE OUTBOARD ACCESS COVER (TM 5-5420-232-10).
4. CLOSE UPPER COVER (TM 5-5420-232-10).



End of Task

3w6280

FUEL FILTER ASSEMBLY REPLACEMENT (Sheet 1 of 1)

TOOLS: General mechanic's tool kit: automotive (SC 5180-90-N26)

SUPPLIES: Packing, preformed (Item 241, Appendix G) (2 required)
Wiping rag (Item 94, Appendix C)

EQUIPMENT CONDITION: Top access doors opened (TM 5-5420-232-10)

REMOVAL:

1. REMOVE FUEL FILTER (1).
 - a. Remove two hose nuts (2) from elbows (3) on fuel filter (1).
 - b. Remove two screws (4), washers (5) and fuel filter (1) from bracket (6).
 - c. Loosen jamnuts (7) on elbows (3).
 - d. Remove elbows (3) and packings (8) from filter (1).
2. INSPECT PARTS FOR DAMAGE. REPLACE AS REQUIRED.

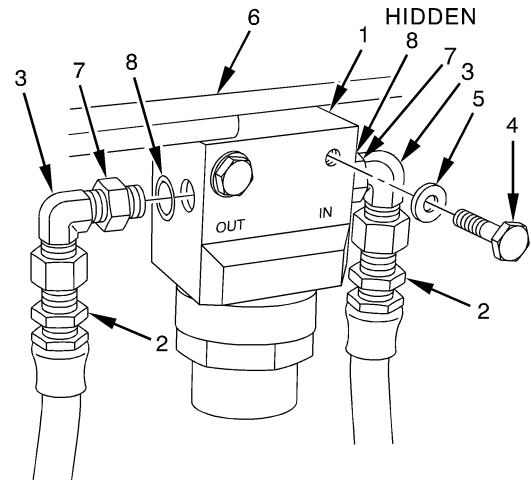
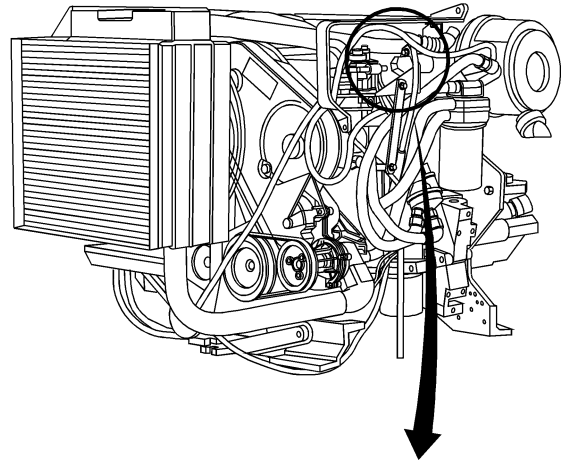
INSTALLATION:

1. INSTALL FILTER (1).

NOTE

Elbows (3) must be pointed down.

- a. Install elbows (3) and new packings (8) on filter (1).
 - b. Position elbows (3) pointed down and tighten jamnuts (7).
 - c. Position filter (1) on bracket (6) and install two screws (4) and washers (5).
 - d. Connect two hose nuts (2) to elbows (3).
2. CLOSE TOP ACCESS DOORS (TM 5-5420-232-10).



LPU ENGINE RPM CHECK/ADJUST (Sheet 1 of 4)

TOOLS: General mechanic's tool kit: automotive (SC 5180-90-N26)
 SPORT harness (Item 352, Appendix E)
 Test set, electronics system AN/PSM-95 (SPORT) (Item 347, Appendix E)

PERSONNEL: Two

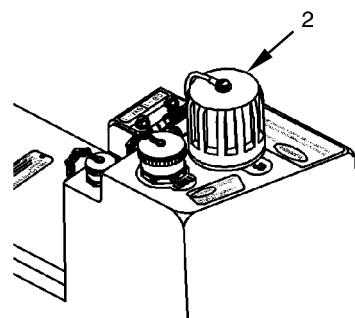
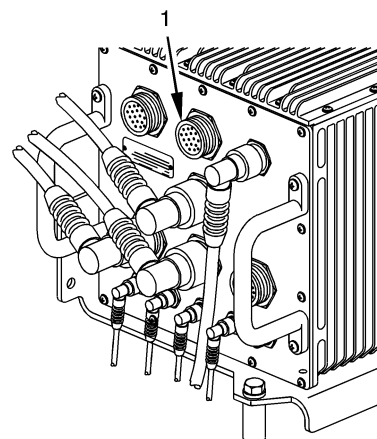
EQUIPMENT CONDITION: Vehicle MASTER POWER set to OFF (TM 5-5420-232-10)

TEST AND INSPECTION:**NOTE**

If internal battery in SPORT is low, shutting off vehicle master power after SPORT has been turned on may cause SPORT to shut down inappropriately.

1. CONNECT SPORT.

- a. Connect SPORT harness P1 connector to ILECU TJ2 connector (1).
- b. Connect SPORT harness P2 connector to SPORT RS-232 SERIAL PORT connector.
- c. Connect keyboard cable connector to SPORT EXTERNAL KEYBOARD connector.
- d. Connect external power module DC OUTPUT cable connector to SPORT PWR connector.
- e. Connect SPORT NATO POWER CABLE to external power module DC INPUT jack.
- f. Connect SPORT NATO POWER CABLE connector to HPDU NATO connector (2).



LPU ENGINE RPM CHECK/ADJUST (Sheet 2 of 4)

2. SET-UP/OPERATE SPORT.

- a. Set vehicle MASTER POWER pushbutton to ON position (TM 5-5420-232-10).
- b. Press LNCHR/POWER SYSTEMS pushbutton on Driver's Integrated Display (DID) (TM 5-5420-232-10).
- c. Press POWER SYSTEMS pushbutton on DID (TM 5-5420-232-10).
- d. Press NATO UTL PWR pushbutton until M is highlighted (TM 5-5420-232-10).
- e. Press OFF/ON pushbutton on SPORT.
- f. Wait approximately 2 minutes for WINDOWS 95 to bootup.
- g. From "START" menu select "Programs/Accessories/Hyperterminal" to open "Hyperterminal" folder.

NOTE

If there is an icon in the "Hyperterminal" dialog box named "hab_trim.ht", then double click icon to open program and go directly to main step CHECK LPU RPM.

- h. From "Hyperterminal" dialog box launch application "Hypertrm.exe" by double clicking it.
- i. In "Connection Description" dialog box type "hab_trim" under "Name".
- j. Click "OK".
- k. In "Phone Number" dialog box set "Connect using:" to "Direct to Com 2" using down arrow.
- l. Click "OK".
- m. In "Com 2 Properties" dialog box, set "Port Settings" as shown below using down arrow.
- n. "Bits per second" = 9600
- o. "Data bits" = 8
- p. "Parity" = none
- q. "Stop bits" = 1
- r. "Flow control" = Xon/Xoff
- s. Click "OK".
- t. Select "Save" from "File" menu to save settings.

Go on to Sheet 3

LPU ENGINE RPM CHECK/ADJUST (Sheet 3 of 4)**3. CHECK LPU RPM.**

- a. Start LPU and allow two minutes of run time for warm-up (TM 5-5420-232-10).
- b. Ensure that LPU is running at idle to check idle RPM (1200-1800 RPM), or OPS to check operating RPM (3850-4250 RPM).

NOTE

Only one RPM sample is displayed each time "w" is typed in and ENTER is pressed on keyboard. For any additional RPM samples, type in "w" and press ENTER again.

- c. Type in "w", then press ENTER on keyboard.

NOTE

The RPM readout will be displayed out of the usable screen area. Use the mouse and scroll bar to scroll up to line: INFO> QUERY_USER_PKG: THE CURRENT RPM IS ____.

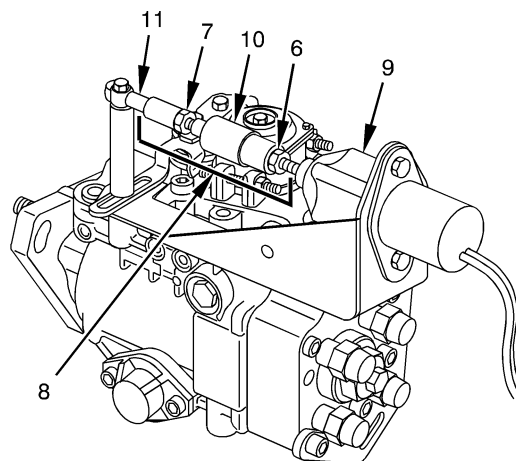
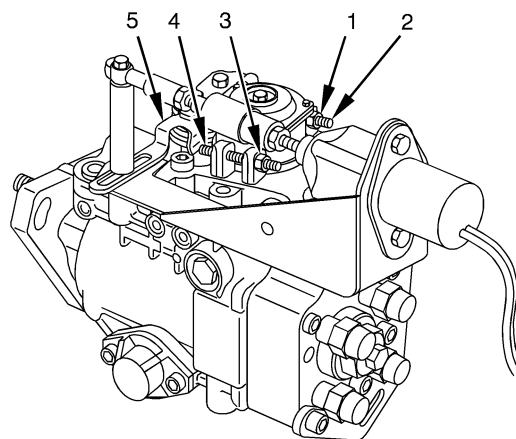
- d. Record displayed RPM.
- e. Verify that recorded idle RPM is between 1200 and 1800 RPM for idle, or 3850-4250 RPM for OPS.

ADJUSTMENT:**WARNING**

Engine components are hot. Use precautions to prevent burns.

ADJUST THROTTLE SETTINGS.

- a. Operate LPU (TM 5-5420-232-10).
- b. Loosen jam nut (1) on idle speed set screw (2) and adjust idle speed to 1200 to 1800 RPM. Tighten jam nut (1).
- c. Loosen jam nut (3) on high speed set screw (4).
- d. Manually move throttle (5) until it contacts high speed set screw (4).
- e. While manually holding throttle (5) against high speed set screw (4), adjust screw (4) to obtain a speed of 3850 to 4250 RPM. Tighten jam nut (3).
- f. Shut down LPU (TM 5-5420-232-10).
- g. Loosen jam nuts (6), (7).
- h. Adjust overall length of throttle actuator linkage (8) so that when solenoid (9) is actuated, spring (10) extends 3/16-inch (0.48 cm). If rod end (11) of spring (10) was removed, reinstall a minimum of five turns.
- i. Tighten jam nuts (6), (7).
- j. With solenoid (9) not actuated, ensure that throttle (5) is against idle speed set screw (2).



LPU ENGINE RPM CHECK/ADJUST (Sheet 4 of 4)

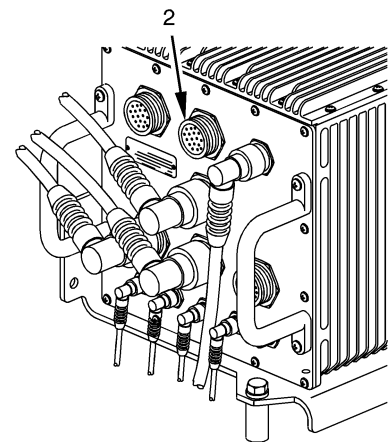
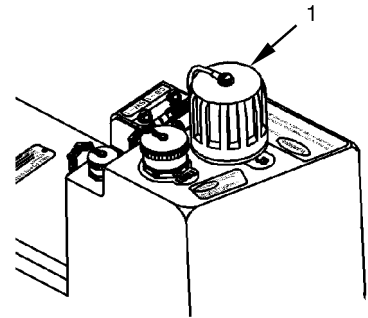
TEST AND INSPECTION:

1. SHUT DOWN SPORT.

- Select "Exit" from "File" menu to exit "hyperterminal".
- In "hyperterminal" dialog box click "Yes".
- Select "Close" from "File" menu to close "Hyperterminal" dialog box.
- Double click "Shutdown" icon to shutdown SPORT.
- In "SPORT System Shutdown" dialog box click "OK".
- When display shows "It's now safe to turn off your computer" press FNC pushbutton and then press and release OFF/ON pushbutton.
- Set vehicle MASTER POWER pushbutton to OFF (TM 5-5420-232-10).

2. DISCONNECT SPORT.

- Disconnect SPORT NATO POWER CABLE from HPDU NATO connector (1).
- Disconnect SPORT NATO POWER CABLE from external power cable DC INPUT jack.
- Disconnect external power module DC OUTPUT cable connector from SPORT PWR connector.
- Disconnect keyboard cable connector from SPORT EXTERNAL KEYBOARD CONNECTOR.
- Disconnect SPORT harness P2 connector from SPORT RS-232 SERIAL PORT.
- Disconnect SPORT harness P1 connector from ILECU TJ2 connector (2)



End of Task

3h1560

CLIP BRACKET (LPU DOOR PIN) REPLACEMENT (Sheet 1 of 1)

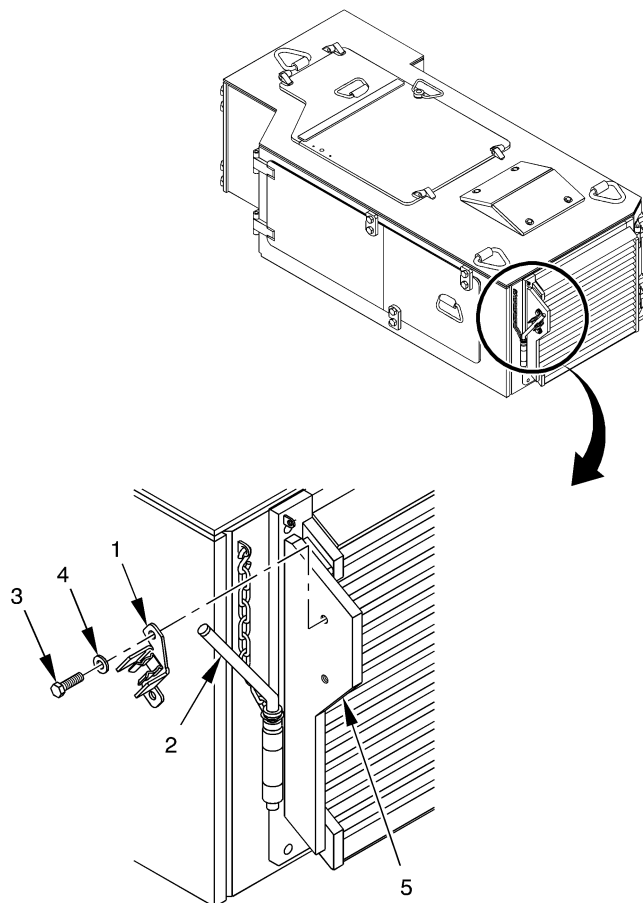
TOOLS: General mechanic's tool kit: automotive (SC 5180-90-N26)
 Socket, 3/8-inch drive, 9/16-inch (Item 235, Appendix E)
 Torque wrench, 0-60 N•m (Item 330, Appendix E)

REMOVAL:

1. REMOVE BRACKET (1).
 - a. Lift retainer (2) out of bracket (1). Turn retainer (2) up and out of way.
 - b. Remove two screws (3) and washers (4) from bracket (1) and door (5).
2. INSPECT PARTS FOR DAMAGE. REPLACE AS REQUIRED.

INSTALLATION:

1. INSTALL BRACKET (1).
 - a. Put bracket (1) in place on door (5). Loosely install two screws (3) and washers (4).
 - b. Slide bracket (1) back and forth, as needed, and put retainer (2) in bracket (1). Tighten screws (3) with wrench.
2. TORQUE SCREWS (3) BETWEEN 40-45 N•m (30-33 LB-FT).



SECTION II. TOOLS LIST (Continued)

(1) Item No.	(2) Description	(3) NSN	(4) Reference
363	Crowfoot attachment, 3/8-inch drive, 7/16-inch	5120-01-335-1092	CTA 50-970
364	Crowfoot attachment, 3/8-inch drive, 7/8-inch	5120-00-181-6765	CTA 50-970
365	Eyebolt	5306-00-050-0346	CTA 50-970
366	Gloves, rubber, rolled edge	8415-00-266-8675	CTA 50-970
367	Crowfoot attachment, 3/8-inch drive, 17-millimeter	5120-00-355-1688	CTA 50-970
368	Die set, metal stamping, alphabetical and numerical, 3/16-inch	5110-00-293-1905	CTA 50-970

SECTION II. REPLACEMENT PARTS LIST (Continued)

(1) Item No.	(2) Description	(3) Part Number
475	Washer, key	MS15820-1
476	Washer, lock	DIN128-A16-FST-A3C
477	Washer, lock	MS35338-138
478	Washer, lock	DIN6796-12-FST-A3C
479	Washer, lock	DIN127-A6-FST-A3C
480	Washer, lock	12387272-38
481	Washer, lock	12387381-36
482	Washer, lock	MS35338-104
483	Washer, lock	12387272-44
484	X-washer	7404624
485	X-washer	7404671
486	Ring, retaining	D67-3161
487	Nut, self-locking	95615A210
488	Gasket	028175757
489	Washer	N0138326
490	Locknut	95615A160
491	Gasket	028115441C
492	Seal	N0138123
493	Decal	98GD064
494	Gasket	028103483H
495	Gasket	028103533
496	Retaining ring	MS16625-4475
497	Ring	MS28774-214
498	Packing, preformed	MS83248/1-140
499	Packing, preformed	MS83248/1-140
500	Washer, lock	DIN127-A10-FST-A3C
501	Washer, lock	DIN128-A12-FST-A3P
502	Locknut	93795A210
503	Locknut	95615A210
504	O-ring	068130139
505	Cap, Protective, Dust	MS90376-24Y
506	Nut, self-locking	MS51922-15
507	Nut, self-locking	MS51922-23
508	Nut, self-locking	12387349-32
509	Lockwasher	12387272-43
510	Nut, self-locking	12387349-35
511	Cap, Protective, Dust	MS90376-14R
512	Washer, lock	MS35338-45
513	Tubing, rubber	ZZH601
514	Screw, cap	12387270-58
515	Washer, flat	12387327-1
516	O-ring	M83248/2-912
517	Screw, cap	B1821BH038C300N
518	Washer, flat	12548872
519	Washer, flat	12549051
520	O-ring	MS28775-216
521	Shim	12549081
522	Pin, spring	12387355-36
523	Bolt, self-locking	12274178
524	Pin, spring	MS16562-38
525	Pad, cushioning	12548785
526	Nonmetallic special seal	9376298-3
527	tubing, nonmetallic	12345162

SECTION II. REPLACEMENT PARTS LIST (Continued)

(1) Item No.	(2) Description	(3) Part Number
528	Bearing, sleeve	12548795-1
529	Strap, webbing	12919000-3
530	Washer, lock	20-13-1
531	Lockwasher	MS35338-47
532	Switch, electrical impact wrench	1042
533	Repair kit, electric impact wrench	57K1733
534	Cable, power, electric impact wrench	2306
535	Gasket	12466655
536	O-ring	MS28778-4
537	Washer, lock	DIN6796-10-FST-A3P
538	Pin, spring	ISO8752-6X25-FST
539	Washer, lock	12387269-37
540	Nut, self-locking	MS21044C3
541	Washer, lock	MS35338-141
542	Washer, lock	20-22-1
543	Nut, self-locking	12387349-39
544	Screw, drive	12387333-46
545	Seal	LSCP580158
546	Seal	LSCP580157

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